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REMARKS

The drawings are objected to for the reasons noted in the official action, i.e., the failure to show in the drawings the claimed friction elements (4, 5) being corrugated or sinusoidally corrugated. In response, claim 24--which recites the corrugated or sinusoidally corrugated friction elements (4, 5)--is canceled from this application thereby rendering moot the basis for the objection to the drawings. As such, the Applicant accordingly respectfully requests that the Examiner reconsider and withdraw all objections to the drawing of the present Application.

The paragraph [028] of the specification is then objected to for the reasons noted in the official action. It is the Applicant's belief that the term "driver stage" will be well understood by those of ordinary skill in the arts as referring to a circuit providing a driving current to an electromagnetic coil. Nevertheless, in order to advance prosecution and allowance of the present application, the term "driver stage (18)" in paragraph [028] and in the claims, is replaced with the term "toroidal core control current source", which is fully descriptive and defines the structure, function and operation of the element in question. It will also be noted that this term is fully supported by the specification as originally filed, so that this amendment does not add any new matter to the present invention, the disclosure or the claims.

The above requested specification amendments are believed to overcome all of the raised informalities concerning this case and the Applicant accordingly respectfully requests that the Examiner reconsider and withdraw all objections to the specification of the present Application. If any further amendment to the specification is believed necessary, the Examiner is invited to contact the undersigned representative of the Applicant to discuss the same.

Next, claims 17-29 are then rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for the reasons noted in the official action. The rejected claims are accordingly amended, by the above claim amendments, and all of the presently pending claims are now believed to particularly point out and distinctly claim the subject matter regarded as

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the invention, thereby overcoming all of the raised § 112, second paragraph, rejections. It will be noted that this term is fully supported by the specification as originally filed, so that this amendment does not add any new matter to or alter the scope or meaning of the present invention, the disclosure or the claims, and that the entered claim amendments are directed solely at overcoming the raised indefiniteness rejection(s) and are not directed at distinguishing the present invention from the art of record in this case. The Applicant accordingly respectfully requests that the Examiner reconsider and withdraw all rejections of the claims under 35 U.S.C. § 112.

Next, claims 17, 19-23 and 25-27 are rejected, under 35 U.S.C. § 103, as being unpatentable in view of DE 26 01 121 A1 ("DE '121") and either Wrensch et al. '657 (United States Patent No. 3,368,657) or Anderson et al. '583 (United States Patent No. 5,490,583); claims 18, 28 and 29 are rejected, under 35 U.S.C. § 103, as being unpatentable in view of DE '121 and either Wrensch et al. '657 or Anderson et al. '583 in combination with Watson et al. '779 (United States Patent No. 6,631,779); and claim 24 is rejected, under 35 U.S.C. § 103, as being unpatentable in view of DE '121 and either Wrensch et al. '657 or Anderson et al. '583 in combination with British Publication No. 1,009,286 ("GB '286"). The Applicant acknowledges and respectfully traverses all of the raised obviousness rejections in view of the above amendments and the following remarks.

It will first be noted with respect to the rejections of the claims over the cited prior art that, after review of the claims, the claims are amended to more clearly and explicitly recite the present invention and thus the distinctions of the present invention over the cited prior art. It will be noted that these amendments are fully supported by the specification as originally filed, so that such amendments do not add any new matter to the present invention, the disclosure or the claims, and that the entered claim amendments are directed solely at clarifying the elements and limitations recited therein.

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Now first considering the present invention as recited in independent claim 17, and thereby in dependent claims 18, 19, 21-23 and 25-30 by dependency from claim 17, the present invention is directed to a transmission brake (1) for braking a transmission shaft (3). The transmission brake includes an outer toothing (10) rotationally fixed to an end of the transmission shaft (3), an inner toothing (11) rotationally fixed to a transmission housing wall (2), at least one first friction element (4) rotationally fixed on the outer toothing (10) and at least one second friction element (5) rotationally fixed to the inner toothing (11). As recited in claim 17 as well as dependent claims 18, 19, 21-23 and 25-30, the outer and inner toothings (10, 11) and the first and second friction elements (4, 5) are located generally within an aperture extending through the transmission housing wall (2), as is an actuation element (8) engaging with the first and second friction elements (4, 5) to exert an axial braking pressure against the first and second friction elements (4, 5) when the actuation element (8) is actuated. The brake further includes an electromagnetic actuation device (6, 7) for actuating the actuation element (8) that is located within a brake housing (13) and fixed to the transmission housing wall (2) coaxially with the aperture extending through the transmission housing wall (2).

As will be appreciated from claim 17, therefore, and as described in the specification and drawings of the present Application, that not only does the present invention provide an electromagnetically actuated brake, rather than a hydraulic brake, but the construction of the claimed brake significantly reduces the space required by the transmission brake by locating the brake within the wall of the transmission housing. That is, by integrating the brake into the wall of the transmission housing where the brake includes the inner and outer toothings (10, 11), the first and second friction elements (4, 5) and actuation element (8). This aspect of the present invention is explicitly recited in claim 17 and is also incorporated into claims 18, 19, 21-23 and 25-30 by the recitation

END OF CLAIM

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the outer toothing (10) and the at least one first friction element (4) and the inner toothing (11) and the at least one second friction element (5) being located generally within an aperture extending through the transmission housing wall (2),

and the recitation

an actuation element (8) located within the aperture extending through the transmission housing wall (2).

Turning now to the prior art cited by the Examiner, DE '121 relates to a brake for a shaft 24 wherein the brake includes an element 23 supporting friction elements 21 mounted on the shaft 24 and an element interleaved friction elements 20 being mounted to a housing 15. The friction elements 20, 21 appear to be pressed together to exert a braking force by an electromagnetically actuated disk armature 25 that is actuated by electromagnetic coils 12, 13 in a housing 35 that is secured to the housing 15.

It is, therefore, apparent that the present invention, as recited in claim 17 as well as dependent claims 18, 19, 21-23 and 25-30, is completely and fundamentally distinguished over and from the teachings of DE '121 because, as explicitly shown in FIG. 3 of DE '121, none of the friction elements 20, 21, their supports nor the disk armature 25 are located in an aperture in the wall of either the transmission housing or the brake housing, as presently claimed. Instead, and as clearly shown in FIG. 3 of DE '121, the friction elements, their supports and the disk armature, that is, entire brake apparatus of DE '121, are located within a brake housing that is separate from and external to the transmission housing. It is therefore the Applicant's belief and position that DE '121 does not teach, show, suggest, disclose or in any way hint at the essential aspects of the present invention as recited in claim 17 and thereby in claims 18, 19, 21-23 and 25-30 to those of ordinary skill in the relevant arts under the requirements and provisions of either or both of 35 U.S.C. § 102 or 35 U.S.C. § 103. As such, the raised rejection in view of DE '121 should be withdrawn at this time in view of the forgoing.

Next considering the teachings of Wrensch et al. '657, this reference relates to and describes an armature 40 for use with a brake or a clutch, the implementation described in Wrensch et al. '657 comprising a three part clutch for selecting engaging two shafts 6 and 8

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positioned in end to end coaxial alignment. According to Wrensch et al. '657, the generally disk shaped armature 40 is fixed to an end of the shaft 8 and comprises a friction element that can be electromagnetically deflected toward face to face engagement with a ring of friction material 30 forming a part of the mating face of a generally disk shaped hub 10 that is, in turn, mounted to the facing end of shaft 6. The armature 40 is actuated by an electromagnetic actuator that includes an electromagnetic coil 18 mounted in a shell 14 that is concentric with and rotationally supports the hub 10 and the shaft 6 so that the hub 10 and the shaft 6 rotate within the shell and wherein the shell 14 is fixed to a support 16.

It is therefore apparent that there are again a number of fundamental differences and distinctions between Wrensch et al. '657 and the present invention as recited in claim 17 and thus in claims 18, 19, 21-23 and 25-30. For example, the present invention is directed to a brake for a transmission shaft and, while Wrensch et al. '657 states that the armature 40 may be used in a clutch or a brake, Wrensch et al. '657 actually describes only an implementation using the armature 40 in a clutch and Wrensch et al. '657, in fact, does not describe or suggest how the armature 40 as shown in the clutch could be adapted for use in brake, which is not an insignificant question due to the three part construction of the described clutch as an armature, a hub and the electromagnetic actuator, all of which are mounted in rotational relationships with each other. More specifically, in the Wrensch et al. '657 mechanism the armature and the hub engage with each other, but each rotates independently from the electromagnetic actuator, which is the only one of the three elements that is secured to a non-rotating element 16 and could provide a braking force. The mechanism, as described by Wrensch et al. '657, therefore does not appear to be usable as a brake and, for this reason alone, it is respectfully submitted that it is not relevant to the present invention as recited in the claims.

Further in this regard, and in further basic distinction between the present invention and Wrensch et al. '657, it must be noted that, because Wrensch et al. '657 describes a clutch rather than a brake, which are fundamentally different devices, the Wrensch et al. '657 mechanism functions to couple two shafts together. The present invention, however, which operates as a brake, couples a shaft to a non-rotating structural element, that is, the wall of the

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transmission housing, to provide a braking force to the single shaft of the mechanism. This operation, however, is impossible in the Wrensch et al. '657 mechanism because the only element of the Wrensch et al. '657 that is connected or can connect to a non-moving structural member is shell 14 which is connected to support 16. Shell 14, however, is rotationally separated from the armature and hub and the armature and hub are free to rotate regardless of whether shell 14 is prevented from rotating.

In still further fundamental distinction between the present invention and Wrensch et al. '657, and as in the case of DE '121, the entire Wrensch et al. '657 clutch mechanism is clearly mounted either entirely inside or entirely outside of any housing that might be present. In this regard, it should be noted that Wrensch et al. '657, in fact, does not describe any form of transmission or clutch housing but instead describes only a support 16 that may or may not be part of a housing.

It is, therefore, apparent that the present invention as recited in claim 17 and claims 18, 19, 21-23 and 25-30 is completely and fundamentally distinguished over and from the teachings of Wrensch et al. '657 because, as explicitly shown and described in Wrensch et al. '657, none of the elements of the Wrensch et al. '657 clutch, that is, none of the friction elements, their supports nor the armature, are located in an aperture in the wall of either the transmission housing or the brake housing. Instead, as clearly shown and described in Wrensch et al. '657, and in complete and fundamental distinction from the present invention, the entire Wrensch et al. '657 clutch apparatus, are located entirely inside or entirely outside any support or housing that might happen to be present, again noting that Wrensch et al. '657 does not, in fact, describe any form of housing but only a support 16.

It is therefore the Applicant's belief and position that Wrensch et al. '657 does not teach, show, suggest or in any way hint at any essential aspects of the present invention as recited in claim 17 and thereby in claims 18, 19, 21-23 and 25-30 to those of ordinary skill in the relevant arts under the requirements and provisions of either or both of 35 U.S.C. § 102 or 35 U.S.C. § 103. As such, the raised rejection in view of Wrensch et al. '657 should be withdrawn at this time in view of the foregoing.

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Next considering the teachings of Anderson et al. '583, this reference is very similar to Wrensch et al. '657 except for being specifically designed as a brake for a shaft rather than a clutch for connecting two shafts, so that one side of the friction elements is structurally connected to a non-rotating element to provide a braking force rather than to a second shaft. Another difference from Wrensch et al. '657 is that the Anderson et al. '583 brake includes a permanent magnet for biasing the friction elements and their actuator into a specified unactuated position until the brake is actuated by the electromagnet coils.

Again, however, and as in the case of Wrensch et al. '657, the entire Anderson et al. '583 brake mechanism is clearly mounted either entirely inside or entirely outside of any housing that might be present. In this regard, it should be noted that Wrensch et al. '657, in fact, does not describe any form of transmission or clutch housing but instead describes only a support plate 2 that is obviously not a part of any form of housing.

It is, therefore, apparent that the present invention as recited in claim 17 and claims 18, 19, 21-23 and 25-30 is completely and fundamentally distinguished over and from the teachings of Anderson et al. '583 because, as explicitly shown and described in Anderson et al. '583, none of the elements of the Anderson et al. '583 brake mechanism are located in an aperture in the wall of either a transmission housing or a brake housing. Instead, as clearly shown and described in Anderson et al. '583, and in complete and fundamental distinction from the present invention, the entire Anderson et al. '583 brake apparatus is located entirely inside or entirely outside any support or housing that might happen to be present, again noting that Anderson et al. '583 does not in fact describe any form of housing but only a support plate 2.

It is, therefore, the Applicant's belief and position that Anderson et al. '583 does not teach, show, suggest or in any way hint at the essential aspects of the present invention as recited in claim 17 and thereby in claims 18, 19, 21-23 and 25-30 to those of ordinary skill in the relevant arts under the requirements and provisions of either or both of 35 U.S.C. § 102 or 35 U.S.C. § 103. As such, the raised rejection in view of Anderson et al. '583 should be withdrawn at this time in view of the foregoing.

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Turning now to the combination of DE '121 and either Wrensch et al. '657 or Anderson et al. '583, which is the basis for all rejections of claims 17-9, 21-23 and 25-30, it is apparent from the above discussion that none of DE '121, Wrensch et al. '657 or Anderson et al. '583 in any way teach, describe, show, suggest or hint at locating a brake mechanism, that is, at least the inner and outer toothings (10, 11), the first and second friction elements (4, 5) and actuation element (8) of a transmission brake, within an aperture through the transmission housing wall.

It is also apparent that the differences between DE '121, Wrensch et al. '657 and Anderson et al. '583 are such as to render the combination of the specific teachings of these references unlikely, if not impossible, because of conflicts between the respective teachings. For example, DE '121, Wrensch et al. '657 or Anderson et al. '583 describes a mechanism wherein at least the friction elements and friction element actuator are external to any form of housing and, in the Wrensch et al. '657 and Anderson et al. '583 mechanisms are, in fact, located in separate housings or casings that are entirely separate from any transmission housing. This arrangement is thereby directly contrary the presently claimed invention so that the combination of DE '121, Wrensch et al. '657 and/or Anderson et al. '583 would obviously lead to a mechanism that in no way resembles that of the present invention, as recited in claim 17 and thus in claims 18, 19, 21-23 and 25-30.

It is therefore the Applicant's belief and position that claim 3 and thereby claims 18, 19, 21-23 and 25-30 are fully and patentably distinguished over and from the teachings, descriptions, suggestions and hints of DE '121, Wrensch et al. '657 and/or Anderson et al. '583, taken individually or in any permissible combination, under the requirements and provisions of 35 U.S.C. § 103. The Applicant accordingly respectfully requests that the Examiner reconsider and withdraw all rejections of claim 17 and thereby claims 18, 19, 21-23 and 25-30 under 35 U.S.C. § 103 over DE '121, Wrensch et al. '657 and/or Anderson et al. '583, either taken individually or in any permissible combination, and allow of claim 17, 18, 19, 21-23 and 25-30 as presented herein above.

Now considering the rejections of claims under 35 U.S.C. § 103 over either, or both, of Watson et al. '779 or GB '286 in combination with one or more of Wrensch et al. '657 and

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Anderson et al. '583, the Examiner cites Watson et al. '779 only with respect to a teaching of a pulse width modulation of a coil to control a brake or clutch. Even if this teaching were regarded as somehow relevant to the present invention, which the Applicant questions and the teaching as a whole is directed to an on-demand drive system for a vehicle rather than to a transmission shaft brake, Watson et al. '779 still does not describe, teach, suggest, disclose or in any way hint at locating a brake mechanism, that is, at least the inner and outer toothings (10, 11), the first and second friction elements (4, 5) and actuation element (8) of a transmission brake, within an aperture through the transmission housing wall. Watson et al. '779 thereby does not describe, teach, show, suggest or hint at essential aspects of the present invention as recited in claim 17 and as thereby recited in claims 18, 19, 21-23 and 25-30 be dependency from claim 3.

It must be further noted in this regard that, as discussed in detail above, none of DE '121, Wrensch et al. '657 and Anderson et al. '583 in any way describe, teach, suggest, disclose or hint these essential aspects of the present invention. The combination of Watson et al. '779 with any of DE '121, Wrensch et al. '657 and/or Anderson et al. '583 therefore will not and cannot teach, describe, suggest or hint at locating a brake mechanism, that is, at least the inner and outer toothings (10, 11), the first and second friction elements (4, 5) and actuation element (8) of a transmission brake, within an aperture through the transmission housing wall under the requirements and provisions of 35 U.S.C. § 103.

It is, therefore, the Applicant's belief and position that claim 17 and thereby claims 18, 19, 21-23 and 25-30 are fully and patentably distinguished over and from the teachings, descriptions, suggestions and hints of DE '121, Wrensch et al. '657, Anderson et al. '583 and/or Watson et al. '779, taken either individually or in any permissible combination, under the requirements and provisions of 35 U.S.C. § 103. The Applicant accordingly respectfully requests that the Examiner reconsider and withdraw all rejections of claim 17 and thereby claims 18, 19, 21-23 and 25-30 under 35 U.S.C. 103 over DE '121, Wrensch et al. '657, Anderson et al. '583 and/or Watson et al. '779, and allow claim 17, 18, 19, 21-23 and 25-30 as presented herein above.

Lastly considering the teachings of GB '286, the Examiner cites GB '286 in combination with DE '121 in view of Wrensch et al. '657 or Anderson et al. '583 in rejecting

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claim 24. As discussed herein above, claim 24 is canceled from this case, with regard to an objection to the specification under 35 U.S.C. § 112, in order to expedite prosecution and allowance of the present Application, so that this rejection is now moot.

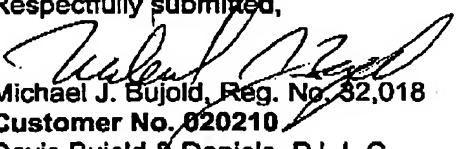
In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejection(s) should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the DE '121, Wrensch et al. '657, Anderson et al. '583, Watson et al. '779 and/or GB '286 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



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